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ABSTRACT

The oral reading miscues of three groups of ten children were qualitatively analyzed to determine whether disabled readers approach the reading process as do young normal readers who read at the same level or as average readers of their own chronlogical age. The groups included ten seventh graders and ten fourth graders who read at a fourth grade instructional level and ten seventh graders who read at a seventh grade instructional level. The scoring procedure used was that of Hood (1976). Statistical analysis showed that disabled readers made more uncorrected miscues which resulted in meaning loss than did younger average readers. Disabled readers tended to make miscues on high frequency words whereas average readers did so on low frequency words. (Author/AA)

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A Comparison of Oral Reading Strategies of Fourth-and Seventh-Grade Children of Fourth-Grade Instructional Level

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To determine if disabled readers attack the reading process like young normal readers who read at the same level or like average readers of their own chronological age, the oral reading miscues of three groups of ten children were qualitatively analyzed by two independent examiners. The scoring procedure used was that of Wood (1976). Statistical analysis showed that disabled readers made more uncorrected miscues which resulted in meaning loss than younger average readers. Disabled readers miscued on high frequency words whereas average readers miscue on low frequency words.

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A Comparison of Oral Reading Strategies of Fourth-and Seventh-Grade Children of Fourth-Grade Instructional Level

Some theories of reading disability have postulated that reading disability is the result of a lag in maturation (cf. DeHirsch, Jansky and Langford, 1966; Satz and Sparrow, 1970). These theories may differ as to the suspected etiology but generally agree that many behaviors of the disabled reader resemble those of a younger normal child.

A formal development of the maturational lag hypothesis is presented by Satz and Sparrow (1970) who defined maturational lag as "slow or delayed development of those brain areas (left hemisphere) which mediate the acquistion of developmental skills which are fundamentally age-linked" (Satz and Sparrow, 1970, p. 31). Their theory predicts that performance of disabled readers will be consistently poorer than that of normal readers of the same age on certain age-related tasks. Whether the two groups of children will perform differently on a task depends upon the age of the children and the task involved. For example, the theory predicts that 7-year-old normal children would perform significantly better than 7-year-old disabled readers on perceptual-motor tasks (because such skills are developing at this age), but the perceptual motor performance of 12-year-old disabled readers would not differ from that of 12-year-old normal readers.

Satz, Rardin and Ross (1971) conducted a study to test specific

predictions of the Satz and Sparrow (1970) theory. Subjects were 7-8-year-old normal and disabled readers and 11-12-year-old normal and disabled readers matched on WISC Performance scores (Wechsler, 1949). It was predicted that the groups of younger Ss would differ on tasks of auditory-visual integration and visual-motor integration but the groups of older Ss would not. Futhermore, older normal readers were predicted to perform better than older disabled readers on tasks of language competence; whereas, the young children would not differ on these tasks. Six tasks were presented to all children. Support for the theory was found as young disabled readers performed less well than young normal readers on the Bender Visuo-Motor Gestalt Test (1938); whereas, the older children did not differ on the perceptual-motor tasks. In addition, all language tests differentiated between performance of the older disabled vs. normal readers but none of the language tests differentiated between the two groups of young children.

Guthrie (1973) compared the performance of three groups of children on subtests of the Kennedy Institute Phonics Test to see whether disabled readers' performance was more similar to chronologically younger normal readers or same-age normal readers. It was hypothesized that either, disabled readers develop some skills normally while other skill areas are depressed or, all reading skill areas are underdeveloped in disabled readers. Correlation matrices for scores of 19 young (7.0 years) normal readers showed that nine of ten intercorrelations among production tests (e.g., letter sound production) and all three intercorrelations among recognition tests (e.g., initial-letter recognition) were above .53 (ps $<$ .01). However, a different pattern was observed for disabled

readers (9.2 years). Although scores on recognition tests were highly related (.66-.79), correlations among production test scores were much lower; only 4 out of 10 intercorrelations being significant. Performance levels of young normal readers and older disabled readers did not differ significantly. Guthrie (1973) concluded that none of the complex reading subskills measured on the Kennedy Institute Phonics Test had developed normally for disabled readers. Informal inspection of individual profiles showed that "a disabled reader is likely to have a profile in which one or two of the simple skills are likely to have a high level of strength (80% or more); whereas; all of the more complex skills in the hierarchy will have a low level of development (40% or less)" (Guthrie, 1973, p. 17). Low intercorrelations among production tests for disabled readers suggest that little transfer across skills occurred for these children.

Much of the research comparing normal and disabled readers has measured quantitative levels of performance on a variety of tasks. Clinical observations describe differences between the ways that disabled vs. normal readers perform a task (e.g., DeHirsch et. al., 1966) but little objective data on qualitative differences are available. Goodman's (1969) qualitiative analysis of oral reading miscues has provided researchers with a new methodology for the study of the way children attack the reading process. Goodman's (1969) miscue analysis has been used to describe the development of reading skills in first-grade children (e.g., Biemiller, 1970) and has been used diagnostically to determine the cue sources used and not used by disabled readers (Goodman, 1972). Weber (1970) compared the oral reading miscues of

of first-grade children who were average readers with miscues made by children who were below-average readers. Weber (1970) concluded that average and below-average readers used syntactic and semantic cues equally well in reading but differed in their use of graphic cues. These results should be viewed with caution because the two groups of children read different stories with different quantities of miscues.

Research such as that of Weber (1970) and Biemiller (1970) has focused on beginning readers. The purpose of the present study was to use miscue analysis to compare the oral reading strategies of older disabled readers to the strategies of: (a) younger normal readers of the same reading proficiency as the disabled readers and, (b) same-age normal readers. Similar to the purpose of Guthrie (1973), it was of interest to examine how the reading strategies of older disabled readers had developed in contrast to the strategies of same-age normal readers, and to younger normal children of the same reading proficieny.

METHOD

Subjects

Ten seventh-graders and ten fourth-graders whose instructional reading level was fourth-grade were selected from the below-average and average reading groups of their respective grades by administering the Standard Reading Inventory (SRI) Word Lists Form B (McCracken, 1966). An equal number of seventh-graders whose instructional reading level was seventh-grade was selected by the same procedure. The criteria

for determining instructional reading level was the grade level of the most advanced list on which a word recognition accuracy score of between 72% and 84% was obtained. The group of seventh-grade disabled readers consisted of three girls and seven boys. There were four girls and six boys in both groups of average readers. All the students in the study attended the same K-8 school and were taught to read through the linguistic series, Lippincott Basic Reading (1969). The school, located in a rural area of middle-income families, had an enrollment of 432 pupils.

Procedure

Students whose instructional reading level was fourth-grade (as defined above) read a selection from Riders on the Earth (Holt, Rinehart & Winston, 1973, Level 15) of fourth-grade readability (Dale & Chall, 1948). Students whose instructional reading level was seventh-grade read a selection from Station Four (Science Research Associates, 1967 Level L) of seventh-grade readability (Dale & Chall, 1948). Prior to the reading of a selection each subject was given the following instructions. "I want you to read this story outloud to me as well as you can. I cannot help you with any of the words. When you are done reading I will ask you some questions about the story." After reading the selection the children were asked seven comprehension questions if they had read the fourth-grade selection or six questions if they read the seventh-grade selection. Each child's oral reading and responses to the comprehension questions were tape recorded and two judges trained in miscue analysis classified each miscue and scored

the comprehension responses independently.

The procedure used for judging the miscues was the same as that described by Hood (1976). Each reading selection was viewed as a test, with each word considered a test item. Any response or lack of response which did not constitute a word-for-word reproduction of the printed message in its spoken form was counted as an error. Errors were counted at the word, rather than at the letter or phrase level except for changes in word order, omissions and insertions. These were counted as one error even though they might have involved more than one word. Categories of error types scored were:

1. ORD -- word order changes (e.g., put the tent up/put up the tent)

2. REV -- substitution of a word containing the same letters as the text word but in a different sequence (e.g., barn/bran)

3. STEM -- substitution of a word containing the same stem as the text word (e.g., walking/walked)

4. AFFIX -- substitution of a word containing the same affix as the text word (e.g., unkind/unkempt, hopped/jumped)

5. SUB -- substitution of a meaningful word for a text word if it cannot be categorized as REV, STEM, or AFFIX

6. NON -- substitution of part of a word or a nonsense word (e.g., pra/pride, stampled/stumbled)

7. INSERT -- an insertion of one or more words between two text words

8. OMIT -- an apparently inadvertant omission of one or more

text words

9. SKIP -- a word omitted with an indication that it is unknown

Use of graphic cues was inferred by noting the graphic similarity of the errors to the text. STEM, AFFIX, SUB and NONSENSE errors were scored as graphically similar (SIMILAR) to the text or different from the text (DIFFERENT), using the following criteria:

1. 2 points: the error and text word began with the same letter
2. 1 point: the error and text word ended with the same letter
3. 1 point: the first letter of the error was the same as the last letter of the text word
4. 1 point: each letter shared by the error and text word
5. 1 point: each shared pair of letters (e.g., horn/torn = 2 shared pairs of letters)
6. 1 point: look alike rhymes (e.g., torn/horn - yes, pain/reign = no

The points were totaled and divided by the number of letters in the text word and in the error. If the result was .50+, it was SIMILAR and less than .50 was considered DIFFERENT. REV and ORDER errors were always scored as SIMILAR since all the letters or text words were included in the error except in a different sequence. INSERT, OMIT and SKIP errors were always scored as DIFFERENT.

The reader's apparent use of contextual cues was inferred by noting whether the errors were syntactically and semantically appropriate to the context. The judge read a sentence as the student read it up to and including the error (or one word past the error if it was

an lNSERT, SKIP, or OMIT). If the sequence of words could not have occurred as the beginning of a sensible sentence, the error was scored as not contextually appropriate (NOT). If the sequence could have begun a sensible sentence, the entire sentence was read as the subject read it up to and including the error, but continuing on with the remainder of the sentence as it appeared in the text. If the error was appropriate, considering only the preceding context, it was scored as (PRE). If the error was contextually appropriate in the whole sentence, but the meaning differed from the intended text meaning, the error was scored as (SEN). If the meaning was equivalent to the meaning of the related sentence, the error was scored as contextually appropriate to the passage as a whole (PASS).

Each error was scored as CORRECTED or NOT CORRECTED, depending on whether the student read the text word (or words) corrrectly after committing an error. All the uncorrected NOT-, PRE- and SEN-CONTEXT errors were considered to represent some meaning loss. The total number of these errors was expressed as a percentage of the number of words in the passage and referred to as a MEANING LOSS score.

Scores which were derived from the coding of errors are the numbers of: (a) errors of each category (e.g., SUB), (b) SIMILAR errors, (c) CORRECTED errors, (d) errors at each level of contextual appropriateness, (e) CORRECTED errors at each level of contextual appropriateness, (f) errors representing MEANING LOSS and (g) TOTAL errors.

RESULTS

Each judge scored each child's oral reading and recorded her judgements on an optical scanning form designed by Hood (personal communication, 1976). The frequency and proportion of each error type made by a subject was determined for each judge. Table 1 presents the alpha reliability coefficients (Cronbach, 1951) for the judgements in each error category. The reliability of judgement of TOTAL errors, MEANING LOSS errors, NONSENSE errors and SKIP errors is comparable to that found by Hood (1976) for two judges. The reliability of judgement of ORD and REV errors is higher than that reported by Hood (1976). And the reliability of judgement of STEM, SUBSTITUTION, INSERT, and OMISSION is lower than Hood (1976). The reliability of judgement of CORRECTED errors, SIMILAR errors and of levels of contextual appropriateness cannot be compared to Hood (1976) because she does not report the estimated reliability for two judges for these categories. The extremely low reliability of judgement of contextual appropriateness many be due to the small amount of variability in the frequency of occurrence of each error for subjects in each group. The reliability of scoring of comprehension was .99 for two judges.

Insert Table 1 about here

Because the children did not make the same number of miscues, the proportion of miscues of each type was computed for each subject. T-

tests were conducted on the proportion of miscues of each type made by seventh-grade disabled readers and fourth-grade average readers. Statistical comparison of seventh-grade average readers to the other groups could not be conducted because these subjects read a different selection. While proportions of miscues made by the seventh-grade average readers will be presented, it should be noted that any differences between the miscues made by seventh-grade average readers and the other two groups may be due to characteristics of the reading selections and not due to characteristics of the children.

Table 2 presents the mean percent and standard deviation of TOTAL errors, MEANING LOSS errors and Comprehension accuracy scores for the three groups. Seventh-grade disabled readers made more TOTAL miscues ($t_{18} = 2.86$, $p < .01$) and more uncorrected miscues which resulted in a loss of meaning ($t_{18} = 2.6$, $p < .01$) than did fourth-grade average readers. However, there was no significant difference in comprehension between the average and disabled readers ($t_{18} = .16$).

Insert Table 2 about here

Table 3 presents the mean proportion and standard deviation of CORRECTED and SIMILAR miscues. There was no significant difference between fourth-grade average readers and seventh-grade disabled readers in their tendency to use graphic cues. Furthermore, although the disabled readers tended to correct their miscues less often there was no significant difference between the groups. It was interesting to note the large variation in correction rate for the fourth-grade children.

Insert Table 3 about here

Table 4 presents mean proportions and standard deviations of miscues according to their contextual appropriatenesss and the degree to which each was corrected by the reader. The fourth-grade average readers made more errors that were judged to be NOT-contextually appropriate than did the seventh-grade poor readers ($\underline{t}_{18} = -3.23$, $p < .01$). No other differences were statistically significant.

Insert Table 4 about here

Table 5 presents mean proportion and standard deviations of each error type. Significant differences were found in the miscue categories of word order (ORD), nonsense (NON) and omission (OMIT). Seventh-grade poor readers made more miscues of the ORD and OMIT type than did fourth-grade average readers ($\underline{t}s_{18} = 2.58$ and 2.21, $\underline{p}s < .05$ respectively). Fourth-grade average readers made more NON errors than the seventh-grade poor readers ($\underline{t}_{18} = 3.18$, $\underline{p} < .005$).

Insert Table 5 about here

DISCUSSION

One purpose of the present study was to investigate the ways in which oral reading behavior of older disabled readers differed from the behavior of younger normal readers if the groups were at the same

level of reading proficiency.

Several differences are apparent between the two groups which were assigned a fourth-grade instructional level based on SRI scores (McCracken, 1966). First, although the seventh-grade disabled readers scored similarly to the fourth-grade normal readers on the Word List subtest (Form B, 1966), they made significantly more oral reading errors on the selection from the basal reader. McCracken and Mullen (1970) indicate that pronouncing words presented in isolation is the single best subtest of the SRI for predicting instructional level (90-94% accuracy in oral reading). The present study does not support this procedure for disabled readers. The average accuracy score for the seventh-grade disabled readers was 90% (four Ss read at less than 90% accuracy; six in the 90-94% range). The average oral reading accuracy of the normal fourth-graders was 94% (No subject read at less than 90% accuracy; seven read in the 90-94% range; three Ss read at 95% or above). These data question the validity of using word lists for prediction of oral reading accuracy for disabled readers.

An examination of the relationship between word recognition ability and oral reading accuracy for seventh-grade average readers showed that their instructional reading level may be under-predicted by word list scores. All seventh-grade average readers read the seventh-grade selection with 95% accuracy or better. Data from this study suggests that further research needs to be conducted into the relationship between recognition of words presented

in isolation and oral reading accuracy for children of different ages and reading abilities.

A second major difference between disabled readers and young average readers was found in the percentage of MEANING LOSS errors. The disabled readers made more errors which resulted in a loss of meaning and which were uncorrected than the young average readers. This finding may or may not indicate a strategy difference between the two groups. Osol and Leslie (1977) found that increases in total error rate made by eighth-grade average readers led to concommitant increases in uncorrected errors which resulted in MEANING LOSS. Thus, the differences in MEANING LOSS errors between the groups in the present study may be caused by differences in error rate or by differences in oral reading strategies of average vs. disabled readers. A study where disabled and average readers read the same selection at comparable error rates would provide the necessary information to separate the two factors operating in the present study.

Although disabled readers made more MEANING LOSS errors than average readers their comprehension scores were not significantly different. There are several possible reasons for such a finding, each of which forms a basis for further research. The content of the story could have been more familiar and/or interesting to the older children. The story, a narrative, described the interaction between two brothers who wanted to use their bedroom for incompatible purposes (study vs. band practice). An argument ensues and is mediated by a friend of the older brothers. The selection ends with

the younger brother leaving to find another place to study. It appears that such content could be familiar to both fourth and seventh-graders; however, differing interest or familiarity between the groups cannot be ruled out as a possible cause of the comprehension scores. A more viable possibility is that the groups made MEANING LOSS errors on different words, which then resulted in differing effects on comprehension. To investigate this possiblity a frequency count for each group was conducted which counted the number of MEANING LOSS errors made on each word in the story. It was arbitrarily decided to examine only those words where at least four of the ten children in a group made a MEANING LOSS error on the word. There were 16 such words. On four words (two verbs, one pronoun and one noun) both fourth and seventh-graders made an equal number of MEANING LOSS errors. On two words the fourth-graders made more MEANING LOSS errors (one was a noun - "guitar," the other was a verb - "squatting"). And on 10 words the seventh-grade disabled readers made more MEANING LOSS errors. Most of these words are high frequency words: "where," "pack," "coming," "first," "your," "prizes," "no," "do," and "a." Only "burst" is a word of relatively low frequency. As so often is clinically reported, disabled readers have difficulty with high frequency, "little" words which have important grammatical functions. Errors on these words, although often resulting in a non-grammatical sentence, do not change the main concepts in the story. Only very specific questions which were designed to tap aspects of comprehension relayed by these words would determine if the children lost meaning

due to miscuing on these words. (It is possible that correction of these errors occurs covertly.)

Disabled and average readers also differed in the proportion of four other error types. Seventh-grade disabled readers made more word order and omission errors than fourth-graders, who made more nonsense and NOT-contextually appropriate errors. The occurrence of more word order errors implies that the reader is not reading word by word but rather that his eye-voice span is at least 2-3 words (the length of the word order miscue).

An examination of the ommission errors made by seveth-graders showed that only five of the twenty-eight omissions were judged to result in no MEANING LOSS, and 13 of the 28 resulted in ungrammatical sentences. The disabled readers corrected only three of the thirteen miscues which resulted in ungrammatical sentences. The only pattern to the omission errors was that four subjects omitted "in," in the sentence "He knew that he would never be able to work downstairs with the television on or in the kitchen....."

The finding that fourth-graders made more NOT-context errors was due to their making more NON errors. In the scoring procedure designed by Hood (1976), if a NON error occurs it is judged as NOT-contextually appropriate. An examination of the words on which the fourth-graders made NON errors showed that these children pronounced the low frequency words "guitar," "minors," and "chords" as nonsense words. All children were able to correct their miscue on "chords" but none corrected the other two words.

The results of the present study seem to indicate several strategy differences between seventh-grade disabled readers and fourth-grade average readers. The older children make more miscues on high frequency words which carry some grammatical function and they do not correct these miscues. Fourth-grade average readers are more likely to miscue on a relatively low frequency word with which they have little conceptual familiarity.

The authors also were interested in comparing the reading strategies of the groups of seventh-graders. However, in order that the groups be somewhat comparable in oral reading accuracy they had to read stories of different readability levels. Although statistical comparisons were inappropriate it is interesting to compare and contrast the proportions of error types made by the groups of seventh-graders. Some of the differences in error types are probably a reflection of story characteristics. For example, the seventh-grade average readers made more REV errors than either other group. But all of the REV errors occurred on two words in the seventh-grade selection. It is likely that these errors occurred because of differences in passage characteristics rather than differences in the strategies typical of the readers.

Both groups of older children made more OMIT errors than the group of younger children. But, the seventh-grade average readers were much more likely to correct omissions which resulted in ungrammatical sentences than were the disabled readers. Thus, although they make the same type of error, the groups differ on their strategy if their reading results in MEANING LOSS.

The groups of average readers made similar proportions of NON errors. As with the fourth-graders, all of the words on which seventh-graders made NON errors were low frequency words (e.g., venomously, scoundrel, archenemy, devastating, staunch). However, there were more different words on which the seventh-graders made NON errors as compared to the fourth-graders. This implies that the oral language vocabulary of older children is more variable than that of younger children.

In conclusion, the reading strategies of older disabled readers are different from those of younger children of the same reading proficiency and from their peers who are average readers. The major difference appears to lie in their higher rate of errors on high frequency function words and their infrequent correction of these errors. In contrast, the errors of the average readers tend to occur on low frequency words with which they have had little experience.

TABLE 1

Alpha Reliability* of Judgement of Error Types

TOTAL errors	.98	ORD	.95
MEANING LOSS	.93	REV	.99
CORRECTED errors	.93	SUB	.82
SIMILAR errors	.80	NON	.89
		INSERT	.77
		OMIT	.86
		SKIP	.90
NOT-context:	.33	STEM	.50
PRE-context:	.36		
SEN-context:	.61	Corrected NOT-context	.07
PASS-context:	.77	Corrected PRE-context	.22
		Corrected SEN-context	.36
		Corrected PASS-context	.49

*Coefficients are based on data from the two groups of subjects who read the same selection

TABLE 2

Mean Percent and Standard Deviation of TOTAL Errors, MEANING LOSS Errors and Comprehension Accuracy Score

Group	%* TOTAL Errors		%* MEANING LOSS Errors		% Accurate Comprehension	
	$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ
Seventh-Grade Disabled Readers	10.0	3.0	5.0	1.8	69.0	17.1
	$t_{18}=2.86$**		$t_{18}=2.60$**		$t_{18}=.16$	
Fourth-Grade Average Readers	6.0	2.0	3.0	1.5	64.0	26.5
Seventh-Grade Average Readers	4.0	1.0	2.0	.7	73.4	8.76

* % = $\frac{\text{Errors}}{\text{\# words in story}}$

** $p < .01$

TABLE 3

Mean Proportion and Standard

Deviation of CORRECTED and SIMILAR Miscues

Group	CORRECTED		SIMILAR	
	$\bar{X}$	σ	$\bar{X}$	σ
Seventh-Grade Disabled Readers	.21	.09	.64	.10
Fourth-Grade Average Readers	.31	.21	.66	.09
Seventh-Grade Average Readers	.30	.13	.54	.11

TABLE 4

Mean Proportions and Standard Deviations of Miscues Judged According to Contextual Appropriateness and their Proportion of Correction

Group		NOT	Correction	PRE	Correction	SEN	Correction*	PASS	Correction
Seventh-Grade Disabled Readers	$\bar{X}$	.17	.20	.30	.34	.18	.26	.34	.05
	σ	.05	.14	.06	.17	.06	.24	.07	.05
Fourth-Grade Average Readers	$\bar{X}$	.27	.37	.29	.44	.12	.43	.32	.13
	σ	.08	.33	.06	.30	.09	.36	.11	.18
Seventh-Grade Average Readers	$\bar{X}$	.33	.30	.36	.39	.14	.15	.17	.12
	σ	.05	.15	.09	.26	.07	.17	.09	.31

** $t_{18} = -3.23$, $p < .01$

* N in these groups was reduced due to one judge scoring errors in this category for a subject but the other judge not doing so.

TABLE 5

Mean Proportions and Standard Deviations of Each Error Category

	ORD		REV		SUB		NON		INSERT		OMIT		SKIP		STEM	
	$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ
Group I (Disabled Seventh-Grade Readers)	.045	.038	.014	.034	.649	.090	.046	.034	.087	.050	.087	.052	.000	.000	.068	.049
t_{18} =	2.58*						3.18**				2.21**					
Group II (Average Fourth-Grade Readers)	.010	.018	.000	.000	.661	.099	.133	.081	.074	.054	.043	.034	.006	.018	.063	.038
Group III (Average Seventh-Grade Readers)	.003	.009	.037	.040	.372	.106	.175	.055	.095	.087	.191	.110	.000	.000	.118	.105

*$p < .05$

** $p < .01$

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